We claim:

1. A process for forming light olefins, the process comprising the steps of:

(a) providing an alcohol-containing stream comprising methanol, ethanol a C3 alcohol and a C4 alcohol; and

(b) contacting at least a portion of the alcohol-containing stream with a molecular sieve catalyst composition in a reaction zone under conditions effective to form ethylene and propylene.

2. The process of claim 1, wherein the process further comprises the steps of:

(c) providing a methanol-containing stream comprising the methanol;

(d) providing a fuel alcohol-containing stream comprising the ethanol, the C3 alcohol and the C4 alcohol; and

(e) combining the methanol-containing stream and the fuel alcohol-containing stream to form the alcohol-containing stream.

3. The process of claim 2, wherein the fuel alcohol-containing stream is formed by contacting syngas with a fuel alcohol synthesis catalyst comprising a microporous zeolitic material under conditions effective to convert the syngas to the fuel alcohol-containing stream.

4. The process of claim 2, wherein the fuel alcohol-containing stream is formed by contacting syngas with a fuel alcohol synthesis catalyst under conditions effective to convert the syngas to the fuel alcohol-containing stream, wherein the fuel alcohol synthesis catalyst comprises one or more of $Cu/ZnO/Cr_2O_3$ and $Cu/ZnO/Al_2O_3$, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

5. The process of claim 2, wherein the fuel alcohol-containing stream is formed by contacting syngas with a fuel alcohol synthesis catalyst under conditions effective to convert the syngas to the fuel alcohol-containing stream, wherein the fuel alcohol synthesis catalyst comprises an oxide of one or more of zinc,

chromium, copper, cobalt, and nickel, and wherein the fuel alcohol synthesis catalyst optionally is alkali, lanthanum or cerium promoted.

6. The process of claim 2, wherein the fuel alcohol-containing stream is formed by contacting syngas with a fuel alcohol synthesis catalyst under conditions effective to convert the syngas to the fuel alcohol-containing stream, wherein the fuel alcohol synthesis catalyst comprises one or more of MoS_2 and Co/MoS_2, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

7. The process of claim 2, wherein the methanol in the methanol-containing stream is formed by contacting syngas with a methanol synthesis catalyst under conditions effective to convert the syngas to the methanol in the methanol-containing stream, wherein the methanol synthesis catalyst comprises an oxide of one or more of copper, zinc and aluminum.

8. The process of claim 2, wherein the fuel alcohol-containing stream comprises less than about 75 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

9. The process of claim 8, wherein the fuel alcohol-containing stream comprises less than about 65 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

10. The process of claim 9, wherein the fuel alcohol-containing stream comprises less than about 60 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

11. The process of claim 2, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

12. The process of claim 11, wherein the fuel alcohol-containing stream comprises at least about 25 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

13. The process of claim 2, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent C3-C4 alcohols, based on the total weight of the fuel alcohol-containing stream.

14. The process of claim 1, wherein the alcohol-containing stream comprises less than about 90 weight percent methanol, based on the total weight of the alcohol-containing stream.

15. The process of claim 14, wherein the alcohol-containing stream comprises less than about 85 weight percent methanol, based on the total weight of the alcohol-containing stream.

16. The process of claim 15, wherein the alcohol-containing stream comprises less than about 80 weight percent methanol, based on the total weight of the alcohol-containing stream.

17. The process of claim 1, wherein the molecular sieve catalyst composition comprises a molecular sieve selected from the group consisting of: MeAPSO, SAPO-5, SAPO-8, SAPO-11, SAPO-16, SAPO-17, SAPO-18, SAPO-20, SAPO-31, SAPO-34, SAPO-35, SAPO-36, SAPO-37, SAPO-40, SAPO-41, SAPO-42, SAPO-44, SAPO-47, SAPO-56, AEI/CHA intergrowths, metal containing forms thereof, intergrown forms thereof, and mixtures thereof.

18. The process of claim 1, wherein the molecular sieve catalyst composition comprises a zeolitic molecular sieve catalyst composition.

19. The process of claim 1, wherein the alcohol-containing stream has a methanol to C2-C4 alcohol weight ratio of from about 0.1 to about 4.0.

20. The process of claim 19, wherein the methanol to C2-C4 alcohol weight ratio is from about 0.33 to about 3.0.

21. The process of claim 1, wherein the ethylene and propylene are yielded in an effluent stream having an ethylene to propylene weight ratio of greater than 1.0.

22. The process of claim 21, wherein the ethylene to propylene weight ratio is from about 1.1 to about 2.5.

23. The process of claim 22, wherein the ethylene to propylene weight ratio is from about 1.2 to about 2.0.

24. The process of claim 1, wherein the process further comprises the steps of:
(c) separating a majority of the ethylene from a majority of the propylene to form an ethylene-containing stream and a propylene-containing stream; and
(d) contacting the ethylene-containing stream with a polymerization catalyst under conditions effective to convert at least a portion of the ethylene contained therein to polyethylene.

25. The process of claim 1, wherein the process further comprises the steps of:
(c) separating a majority of the ethylene from a majority of the propylene to form an ethylene-containing stream and a propylene-containing stream; and
(d) contacting the propylene-containing stream with a polymerization catalyst under conditions effective to convert at least a portion of the propylene contained therein to polypropylene.

26. A process for producing light olefins, the process comprising the steps of:
(a) contacting a first syngas stream comprising carbon monoxide, carbon dioxide and hydrogen with a methanol synthesis catalyst under first conditions

effective to form a methanol-containing stream comprising methanol and water;

(b) contacting a second syngas stream comprising carbon monoxide, carbon dioxide and hydrogen with a fuel alcohol synthesis catalyst under second conditions effective to form a fuel alcohol-containing stream comprising ethanol, propanol and butanol;

(c) combining at least a portion of the methanol-containing stream with at least a portion of the fuel alcohol-containing stream to form a combined stream; and

(d) contacting at least a portion of the combined stream with a molecular sieve catalyst composition in a reaction zone under third conditions effective to form ethylene and propylene.

27. The process of claim 26, wherein the molecular sieve catalyst composition comprises a molecular sieve selected from the group consisting of: MeAPSO, SAPO-5, SAPO-8, SAPO-11, SAPO-16, SAPO-17, SAPO-18, SAPO-20, SAPO-31, SAPO-34, SAPO-35, SAPO-36, SAPO-37, SAPO-40, SAPO-41, SAPO-42, SAPO-44, SAPO-47, SAPO-56, AEI/CHA intergrowths, metal containing forms thereof, intergrown forms thereof, and mixtures thereof.

28. The process of claim 26, wherein the molecular sieve catalyst composition comprises a zeolitic molecular sieve catalyst composition.

29. The process of claim 26, wherein the combined stream has a methanol to C2-C4 alcohol weight ratio of from about 0.1 to about 4.0.

30. The process of claim 29, wherein the methanol to C2-C4 alcohol weight ratio is from about 0.33 to about 3.0.

31. The process of claim 26, wherein the fuel alcohol synthesis catalyst comprises a microporous zeolitic material.

32. The process of claim 26, wherein the fuel alcohol synthesis catalyst comprises one or more of $Cu/ZnO/Cr_2O_3$ and $Cu/ZnO/Al_2O_3$, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

33. The process of claim 26, wherein the fuel alcohol synthesis catalyst comprises an oxide of one or more of zinc, chromium, copper, cobalt, and nickel, and wherein the fuel alcohol synthesis catalyst optionally is alkali, lanthanum or cerium promoted.

34. The process of claim 26, wherein the fuel alcohol synthesis catalyst comprises one or more of MoS_2 and Co/MoS_2, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

35. The process of claim 26, wherein the methanol synthesis catalyst comprises an oxide of one or more of copper, zinc and aluminum.

36. The process of claim 26, wherein the process further comprises the step of:
(e) removing water from the combined stream prior to step (d).

37. The process of claim 26, wherein the process further comprises the steps of:
(e) contacting a natural gas stream with oxygen under fourth conditions effective to convert the natural gas stream into an initial syngas stream; and
(f) separating the initial syngas stream into the first syngas stream and the second syngas stream.

38. The process of claim 26, wherein the ethylene and propylene are yielded in an effluent stream having an ethylene to propylene weight ratio of greater than 1.0.

39. The process of claim 38, wherein the ethylene to propylene weight ratio is from about 1.1 to about 2.5.

40. The process of claim 39, wherein the ethylene to propylene weight ratio is from about 1.2 to about 2.0.

41. The process of claim 26, wherein steps (a) and (b) occur in parallel.

42. The process of claim 26, wherein the fuel alcohol-containing stream comprises less than about 75 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

43. The process of claim 42, wherein the fuel alcohol-containing stream comprises less than about 65 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

44. The process of claim 43, wherein the fuel alcohol-containing stream comprises less than about 60 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

45. The process of claim 26, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

46. The process of claim 45, wherein the fuel alcohol-containing stream comprises at least about 25 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

47. The process of claim 26, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent C3-C4 alcohols, based on the total weight of the fuel alcohol-containing stream.

48. The process of claim 26, wherein the process further comprises the steps of:

(e) separating a majority of the ethylene from a majority of the propylene to form an ethylene-containing stream and a propylene-containing stream; and

(f) contacting the ethylene-containing stream with a polymerization catalyst under fourth conditions effective to convert at least a portion of the ethylene contained therein to polyethylene.

49. The process of claim 26, wherein the process further comprises the steps of:
(e) separating a majority of the ethylene from a majority of the propylene to form an ethylene-containing stream and a propylene-containing stream; and
(f) contacting the propylene-containing stream with a polymerization catalyst under fourth conditions effective to convert at least a portion of the propylene contained therein to polypropylene.

50. A process for producing an alcohol mixture suitable for use as a feedstock for an oxygenate to olefin reaction system, the process comprising the steps of:
(a) contacting a first syngas stream comprising carbon monoxide, carbon dioxide and hydrogen with a methanol synthesis catalyst under first conditions effective to form a methanol-containing stream comprising methanol and water;
(b) contacting a second syngas stream comprising carbon monoxide, carbon dioxide and hydrogen with a fuel alcohol synthesis catalyst under second conditions effective to form a fuel alcohol-containing stream comprising ethanol, propanol and butanol; and
(c) combining at least a portion of the methanol-containing stream with at least a portion of the fuel alcohol-containing stream to form a combined stream, wherein the combined stream has a methanol to C2-C4 alcohol weight ratio of from about 0.1 to about 4.0.

51. The process of claim 50, wherein the methanol to C2-C4 alcohol weight ratio is from about 0.33 to about 3.0.

52. The process of claim 51, wherein the methanol to C2-C4 alcohol weight ratio is from about 0.5 to about 1.0.

53. The process of claim 50, wherein the process further comprises the steps of:
(d) removing the water from the combined stream to form a dry combined stream.

54. The process of claim 53, wherein the dry combined stream comprises less than about 10 weight percent water based on the total weight of the dry combined stream.

55. The process of claim 50, wherein the fuel alcohol synthesis catalyst comprises a microporous zeolitic material.

56. The process of claim 50, wherein the fuel alcohol synthesis catalyst comprises one or more of $Cu/ZnO/Cr_2O_3$ and $Cu/ZnO/Al_2O_3$, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

57. The process of claim 50, wherein the fuel alcohol synthesis catalyst comprises an oxide of one or more of zinc, chromium, copper, cobalt, and nickel, and wherein the fuel alcohol synthesis catalyst optionally is alkali, lanthanum or cerium promoted.

58. The process of claim 50, wherein the fuel alcohol synthesis catalyst comprises one or more of MoS_2 and Co/MoS_2, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

59. The process of claim 50, wherein the methanol synthesis catalyst comprises an oxide of one or more of copper, zinc and aluminum.

60. The process of claim 50, wherein the process further comprises the steps of:
(d) contacting a natural gas stream with oxygen under fourth conditions effective to convert the natural gas stream into an initial syngas stream; and
(e) separating the initial syngas stream into the first syngas stream and the second syngas stream.

61. The process of claim 50, wherein steps (a) and (b) occur in parallel.

62. The process of claim 50, wherein the fuel alcohol-containing stream comprises less than about 75 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

63. The process of claim 62, wherein the fuel alcohol-containing stream comprises less than about 65 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

64. The process of claim 63, wherein the fuel alcohol-containing stream comprises less than about 60 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

65. The process of claim 50, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

66. The process of claim 65, wherein the fuel alcohol-containing stream comprises at least about 25 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

67. The process of claim 50, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent C3-C4 alcohols, based on the total weight of the fuel alcohol-containing stream.

68. The process of claim 50, wherein the process further comprises the step of:
(d) directing the combined stream or a portion thereof to an oxygenate to olefin reaction system.

69. The process of claim 68, wherein the portion thereof is an aliquot portion of the combined stream.

70. The process of claim 68, wherein the portion thereof is a non-aliquot portion of the combined stream.

71. A process for producing light olefins, wherein the process comprises the steps of:

(a) contacting a first syngas stream comprising carbon monoxide, carbon dioxide and hydrogen with a methanol synthesis catalyst under first conditions effective to form a methanol-containing stream comprising methanol and water;

(b) contacting a second syngas stream comprising carbon monoxide, carbon dioxide and hydrogen with a fuel alcohol synthesis catalyst under second conditions effective to form a fuel alcohol-containing stream comprising ethanol, propanol and butanol;

(c) combining at least a portion of the methanol-containing stream with at least a portion of the fuel alcohol-containing stream to form a combined stream;

(d) contacting at least a portion of the combined stream with a molecular sieve catalyst composition in a reaction system under third conditions effective to convert the methanol, the ethanol, optionally the propanol and optionally the butanol to light olefins;

(e) yielding an effluent stream from the reaction system, wherein the effluent stream comprises ethylene and propylene and has an ethylene to propylene weight ratio of from about 0.9 to about 3.0.

72. The process of claim 71, wherein the ethylene to propylene weight ratio is from about 1.1 to about 2.5.

73. The process of claim 72, wherein the ethylene to propylene weight ratio is from about 1.2 to about 2.0.

74. The process of claim 71, wherein the molecular sieve catalyst composition comprises a molecular sieve selected from the group consisting of: MeAPSO, SAPO-5, SAPO-8, SAPO-11, SAPO-16, SAPO-17, SAPO-18, SAPO-20, SAPO-31, SAPO-34, SAPO-35, SAPO-36, SAPO-37, SAPO-40, SAPO-41, SAPO-42, SAPO-44, SAPO-47, SAPO-56, AEI/CHA intergrowths, metal containing forms thereof, intergrown forms thereof, and mixtures thereof.

75. The process of claim 71, wherein the molecular sieve catalyst composition comprises a zeolitic molecular sieve catalyst composition.

76. The process of claim 71, wherein the combined stream has a methanol to C2-C4 alcohol weight ratio of from about 0.1 to about 4.0.

77. The process of claim 76, wherein the methanol to C2-C4 alcohol weight ratio is from about 0.33 to about 3.0.

78. The process of claim 71, wherein the process further comprises the steps of:
(f) removing the water from the combined stream before step (d).

79. The process of claim 71, wherein the fuel alcohol synthesis catalyst comprises a microporous zeolitic material.

80. The process of claim 71, wherein the fuel alcohol synthesis catalyst comprises one or more of $Cu/ZnO/Cr_2O_3$ and $Cu/ZnO/Al_2O_3$, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

81. The process of claim 71, wherein the fuel alcohol synthesis catalyst comprises an oxide of one or more of zinc, chromium, copper, cobalt, and nickel, and wherein the fuel alcohol synthesis catalyst optionally is alkali, lanthanum or cerium promoted.

82. The process of claim 71, wherein the fuel alcohol synthesis catalyst comprises one or more of MoS_2 and Co/MoS_2, and wherein the fuel alcohol synthesis catalyst optionally is alkali promoted.

83. The process of claim 71, wherein the methanol synthesis catalyst comprises an oxide of one or more of copper, zinc and aluminum.

84. The process of claim 71, wherein the process further comprises the steps of:
(f) contacting a natural gas stream with oxygen under fourth conditions effective to convert the natural gas stream into an initial syngas stream; and
(g) separating the initial syngas stream into the first syngas stream and the second syngas stream.

85. The process of claim 71, wherein steps (a) and (b) occur in parallel.

86. The process of claim 71, wherein the fuel alcohol-containing stream comprises less than about 75 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

87. The process of claim 86, wherein the fuel alcohol-containing stream comprises less than about 65 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

88. The process of claim 87, wherein the fuel alcohol-containing stream comprises less than about 60 weight percent methanol, based on the total weight of the fuel alcohol-containing stream.

89. The process of claim 71, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

90. The process of claim 89, wherein the fuel alcohol-containing stream comprises at least about 25 weight percent ethanol, based on the total weight of the fuel alcohol-containing stream.

91. The process of claim 71, wherein the fuel alcohol-containing stream comprises at least about 10 weight percent C3-C4 alcohols, based on the total weight of the fuel alcohol-containing stream.

92. The process of claim 71, wherein the process further comprises the steps of:

(f) separating a majority of the ethylene from a majority of the propylene to form an ethylene-containing stream and a propylene-containing stream; and

(g) contacting the ethylene-containing stream with a polymerization catalyst under fourth conditions effective to convert at least a portion of the ethylene contained therein to polyethylene.

93. The process of claim 71, wherein the process further comprises the steps of:

(f) separating a majority of the ethylene from a majority of the propylene to form an ethylene-containing stream and a propylene-containing stream; and

(g) contacting the propylene-containing stream with a polymerization catalyst under fourth conditions effective to convert at least a portion of the propylene contained therein to polypropylene.